Emission Isolation Flux Chambers and Risk Assessments: The Use of Empirical Data and Appropriate Models to Eliminate Insignificant Exposure Pathways

Primary author: Tina M. Carlsen*
Lawrence Livermore National Laboratory
P.O. Box 808, L-619, Livermore, CA 94551
Phone: (510) 422-7103 Fax: (510) 423-9203

We recently reevaluated the baseline risk assessment conducted for the General Services Area of Lawrence Livermore National Laboratory's Site 300. The baseline assessment was completed using characterization data consisting primarily of ground water and soil/rock analytical results. Therefore, in order to estimate the risk of inhalation of volatile organic compounds (VOCs) in both outdoor and indoor air, we relied on simple, conservative models. The resulting additional cancer risk from inhalation of indoor air was calculated to be 1×10^{-5}, and that for outdoor air was 1×10^{-4}. Although these risk estimates are not excessively high, the U. S. Environmental Protection Agency currently uses 1×10^{-6} as a "point-of-departure" for evaluating cleanup alternatives. Thus, our estimated risk would have required us to expend considerable effort developing and evaluating cleanup alternatives.

To more accurately estimate the rate of VOC emissions from the subsurface, we utilized emission isolation flux chambers. The direct soil flux measurements were used in conjunction with carefully selected and modified exposure models to estimate contaminant concentrations in air. Because direct soil flux measurements are more accurate than modeled flux concentrations, the revised calculations better characterize the potential site risks. Using these techniques, we estimated an indoor air cancer risk of 7×10^{-7} and an outdoor air cancer risk of 2×10^{-7}. We were therefore able to eliminate the inhalation exposure pathway from consideration during the development of remedial alternatives for this site.

*Presenting author at conference.

Work performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

Emission Isolation Flux Chambers and Risk Assessments: The Use of Empirical Data and Appropriate Models to Eliminate Insignificant Exposure Pathways

Primary author: Tina M. Carlsen*
Lawrence Livermore National Laboratory
P.O. Box 808, L-619, Livermore, CA 94551
Phone: (510) 422-7103 Fax: (510) 423-9203

Co-authors: Stan A. Martins, Lawrence Livermore National Laboratory, P.O. Box 808, L-524, Livermore, CA 94551, Phone: (510) 423-2058, Fax: (510) 422-8020; Gwen Caviness, Weiss Associates, 5500 Shellmound St., Emeryville, CA, Phone: (510) 423-0154, Fax: (510) 424-5432; and Pleas McNeel, Weiss Associates, 5500 Shellmound St., Emeryville, CA, Phone: (510) 423-7878, Fax: (510) 424-5432

*Presenting author at conference.